Claims

We claim:

1. A quantizer circuit, having an analog input terminal, a first threshold input, a second threshold input, and an output terminal, comprising:

an first adder coupled to receive the first threshold;

a first dither signal generator having an output coupled to the first adder, wherein the first adder adds the first threshold to the first dither signal;

a first comparator, having a first and second input, the first input coupled to receive the input signal from the analog input terminal, the second input coupled to the output of the first adder to receive the sum generated by the first adder;

an second adder coupled to receive the second threshold;

a second dither signal generator having an output coupled to the second adder, wherein the second adder subtracts the second dither signal from the second threshold; and

a second comparator, having a first and a second input, the first input coupled to receive the input signal from the analog input terminal, the second input coupled to the output of the second adder to receive the result generated by the second adder.

2. The quantizer circuit as recited in claim 1, wherein the first dither signal generator generates a dither signal having pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.

3. The quantizer circuit as recited in claim 1, wherein the second dither signal generator generates a dither signal having pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.

4. A sigma delta modulator, comprising:

a first adder coupled to receive an input signal;

a feed forward Z transfer function G(z) coupled to the adder;

a quantizer circuit coupled to the feed forward Z transfer function G(z), the quantizer circuit, having an analog input terminal, a first threshold input, a second threshold input, and an output terminal, the quantizer circuit comprises,

a second adder coupled to receive the first threshold,

a first dither signal generator having an output coupled to the second adder, wherein the second adder adds the first threshold to the first dither signal,

a first comparator, having a first and second input, the first input coupled to receive the input signal from the analog input terminal, the second input coupled to the output of the second adder to receive the sum generated by the first second,

an third adder coupled to receive the second threshold,

a second dither signal generator having an output coupled to the third adder, wherein the third adder subtracts the second dither signal from the second threshold, and

a second comparator, having a first and a second input, the first input coupled to receive the input signal from the analog input terminal, the second input coupled to the output of the third adder to receive the result generated by the third adder; and

a feedback transfer function H(z) coupled to the output terminal of the quantizer circuit.

5. The quantizer circuit as recited in claim 4, wherein the first dither signal generator generates a dither signal having pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.

6. The quantizer circuit as recited in claim 4, wherein the second dither signal generator generates a dither signal having pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.

7. A method for operating a quantizer, comprising steps of:

sampling an input signal to provide a sampled input voltage signal;

adding a dither current signal to a first threshold voltage to generate a dithered first threshold signal;

subtracting the dither current signal from a second threshold voltage to generate a dithered second threshold signal;

comparing the sampled input voltage signal with the first threshold signal using a first comparator stage to provide a first quantizer output; and

comparing the sampled input voltage signal with the second threshold signal using a second comparator stage to provide a second quantizer output.

8. The quantizer circuit as recited in claim 7, wherein the step of adding the dither current signal to the first threshold voltage comprises a step of generating the dither signal to have pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.

9. The quantizer circuit as recited in claim 7, wherein the step of subtracting the dither current signal from the second threshold voltage comprises a step of generating the dither signal to have pseudorandom fluctuations in amplitude, and a magnitude that varies inversely to the magnitude of the input signal.